Access DB# 168477

1f

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: JOHN MAPLES Examiner #: 62294 Date: 11/18/03
Art Unit: 1745 Phone Number 30 8-1795 Serial Number: 09/718,148
Mail Box and Bldg/Room Location: CPA23-8E12 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

****

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: FUEL CELL SYSTEM WITH ACTIVE METHANOL CONCENTRATION CONTROL

Inventors (please provide full names): WILLIAM ACKER, GEORGE MCNAMEE, WILLIAM DALEY

Earliest Priority Filing Date: _____

For Sequence Searches Only *Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*

****

STAFF USE ONLY	Type of Search		Vendors and cost where applicable
Searcher:	NA Sequence (#)		STN
Searcher Phone #:	AA Sequence (#)		Dialog
Searcher Location:	Structure (#)		Questel/Orbit
Date Searcher Picked Up:	Bibliographic		Dr.Link
Date Completed:	Litigation		Lexis/Nexis
Searcher Prep & Review Time:	Fulltext		Sequence Systems
Clerical Prep Time:	Patent Family		WWW/Internet
Online Time:	Other		Other (specify)

PTO-1590 (8-01)

=> file caplus
FILE 'CAPLUS' ENTERED AT 16:16:35 ON 18 NOV 2003
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FILE COVERS 1907 - 18 Nov 2003 VOL 139 ISS 21
FILE LAST UPDATED: 17 Nov 2003 (20031117/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> file wpix
FILE 'WPIX' ENTERED AT 16:16:40 ON 18 NOV 2003

FILE LAST UPDATED: 17 NOV 2003 <20031117/UP>
MOST RECENT DERWENT UPDATE: 200374 <200374/DW>
DERWENT WORLD PATENTS INDEX SUBSCRIBER FILE, COVERS 1963 TO DATE

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>>> PATENT IMAGES AVAILABLE FOR PRINT AND DISPLAY <<<

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http://www.stn-international.de/training_center/patents/stn_guide.pdf <<<

>>> FOR DETAILS OF THE PATENTS COVERED IN CURRENT UPDATES, SEE http://thomsonderwent.com/coverage/latestupdates/ <<<

>>> FOR INFORMATION ON ALL DERWENT WORLD PATENTS INDEX USER GUIDES, PLEASE VISIT:
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KOROMA EIC1700

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=> file compendex
FILE 'COMPENDEX' ENTERED AT 16:16:48 ON 18 NOV 2003
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FILE LAST UPDATED: 17 NOV 2003       <20031117/UP>
FILE COVERS 1970 TO DATE.

<<< SIMULTANEOUS LEFT AND RIGHT TRUNCATION AVAILABLE IN
    THE BASIC INDEX >>>

=> file jicst
FILE 'JICST-EPLUS' ENTERED AT 16:16:54 ON 18 NOV 2003
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FILE COVERS 1985 TO 17 NOV 2003 (20031117/ED)

THE JICST-EPLUS FILE HAS BEEN RELOADED TO REFLECT THE 1999 CONTROLLED
TERM (/CT) THESAURUS RELOAD.

=> d que
L1        40061 SEA FILE=CAPLUS ABB=ON  PLU=ON  FUEL CELL
L2          328 SEA FILE=CAPLUS ABB=ON  PLU=ON  METHANOL?(L)REGULATION?
L3           13 SEA FILE=CAPLUS ABB=ON  PLU=ON  L1 AND L2
L4         2961 SEA FILE=CAPLUS ABB=ON  PLU=ON  METHANOL?(L)FUEL CELL?
L5            4 SEA FILE=CAPLUS ABB=ON  PLU=ON  L4 AND METHANOL(5A)REGULATION?

L6            4 SEA FILE=CAPLUS ABB=ON  PLU=ON  L4 AND METHANOL?(5A)REGULATION?

L9         2263 SEA FILE=CAPLUS ABB=ON  PLU=ON  METHANOL(4A)FUEL(5A)CELL
L10         136 SEA FILE=CAPLUS ABB=ON  PLU=ON  (L3 OR (L5 OR L6) OR L9 OR L4)
                AND (SENSOR OR DETECT? OR REGULAT?)
L11           4 SEA FILE=CAPLUS ABB=ON  PLU=ON  (L3 OR (L5 OR L6) OR L9 OR L4)
                AND SIGNAL AND (SENSOR OR DETECT? OR REGULAT?)
L12         136 SEA FILE=CAPLUS ABB=ON  PLU=ON  L10 OR L11
L16          19 SEA FILE=CAPLUS ABB=ON  PLU=ON  L12 AND METHANOL?(5A)CONCENTRAT
                ?
L17          18 SEA FILE=WPIX ABB=ON  PLU=ON  L12 AND METHANOL?(5A)CONCENTRAT?

L18           2 SEA FILE=COMPENDEX ABB=ON  PLU=ON  L12 AND METHANOL?(5A)CONCENT
                RAT?
L19           1 SEA FILE=JICST-EPLUS ABB=ON  PLU=ON  L12 AND METHANOL?(5A)CONCE
                NTRAT?
L20          34 DUP REM L16 L17 L18 L19 (6 DUPLICATES REMOVED)


=> d ti 1-34
YOU HAVE REQUESTED DATA FROM FILE 'CAPLUS, WPIX, COMPENDEX, JICST-EPLUS' -
CONTINUE? (Y)/N:y
```

L20 ANSWER 1 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 1
TI Infrared sensing of **concentration** of **methanol**'s aqueous solution for a direct **methanol fuel cell**

L20 ANSWER 2 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 2
TI Method for determining the concentration of a fluid solution and its application to direct **methanol fuel cell**

L20 ANSWER 3 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
TI Method of measuring **methanol concentration** in an aqueous solution

L20 ANSWER 4 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
TI Ultrasound sensing of **concentration** of **methanol**'s aqueous solution in direct **methanol fuel cell**

L20 ANSWER 5 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
TI Indirect measurement of fuel concentration in a liquid feed fuel cell

L20 ANSWER 6 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI Gas **sensor**, for e.g. for measuring concentration of hydrogen gas in fuel gas for use in fuel cell, comprises proton conduction layer, first and second electrodes, reference electrode and diffusion controlling portion.

L20 ANSWER 7 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI Process for **regulating** the **methanol concentration** of a direct **methanol fuel cell** system comprises varying a first system parameter, and introducing **methanol** from a **methanol** reservoir depending on the resulting voltage from the fuel solution.

L20 ANSWER 8 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
TI Reliable and fast-responding **methanol concentration sensor** with novel design

L20 ANSWER 9 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
TI Study on the methanol permeability in polyacrylamide solid gel membranes

L20 ANSWER 10 OF 34 COMPENDEX COPYRIGHT 2003 EEI on STN
TI Reliable and fast-responding **methanol concentration sensor** with novel design.

L20 ANSWER 11 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 3
TI Apparatus and methods for **sensor**-less optimization of **methanol concentration** in a direct **methanol fuel cell** system

L20 ANSWER 12 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 4

TI **Regulation** of the fuel concentration in the anode fluid of a direct **methanol fuel cell** by determination of carbon dioxide in the exhaust gas of the cathode

L20 ANSWER 13 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
TI A **methanol sensor** operated in a driven mode for **fuel cell** use

L20 ANSWER 14 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
TI Method for fabrication of direct **methanol fuel cell** system

L20 ANSWER 15 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
TI Apparatus and methods for **sensor**-less optimization of **methanol concentration** in a direct **methanol fuel cell** system

L20 ANSWER 16 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
TI Direct **methanol fuel cell** system including an integrated **methanol sensor** and method of fabrication

L20 ANSWER 17 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI Direct **methanol fuel cell** system for portable electronic devices, has multiple electrical components in base portion for electrical integration of **fuel cell** assembly with **methanol concentration sensor.**

L20 ANSWER 18 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI **Methanol concentration sensor**, for use with fuel supply, comprises membrane electrode, anode and cathode current collector, and current **sensor** to measure current to provide **signal.**

L20 ANSWER 19 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI **Fuel cell** system e.g. direct **methanol fuel cell** system increases **fuel concentration** at anode and increases oxidation of crossover fuel at cathode when **regulator** temperature is below specified range.

L20 ANSWER 20 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI Generation of hydrogen used as **fuel**, involves electro-oxidizing **methanol** at anode in electrolytic **cell** to form protons and electro-reducing protons at cathode to form hydrogen.

L20 ANSWER 21 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI Fuel supply device and method in fuel cell.

L20 ANSWER 22 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI Fuel supply device in fuel cell.

L20 ANSWER 23 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN

TI Fuel supply device in fuel cell.

L20 ANSWER 24 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
TI **Fuel cell** (**methanol**) **sensor** with small load resistance and high oxidant supply

L20 ANSWER 25 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI Determining fuel concentration in electrolyte of fuel cell comprises measuring capacity of capacitor, calculating dielectric constant and determining fuel concentration.

L20 ANSWER 26 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
TI Plasma polymerized barrier films on membranes for direct **methanol** **fuel cells**

L20 ANSWER 27 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 5
TI Design and operation of an electrochemical **methanol** **concentration sensor** for direct **methanol** **fuel cell** systems

L20 ANSWER 28 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 6
TI **Methanol concentration sensor** for aqueous environments such as liquid direct-feed **fuel cells.**

L20 ANSWER 29 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI New perovskite-type solid electrolyte - has alkaline earth metal sites occupied by barium and rare earth metal sites occupied by praseodymium and another rare earth metal.

L20 ANSWER 30 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
TI Manufacture of noble metal catalysts, apparatus for reducing carbon monoxide **concentration**, apparatus for reducing **methanol** **concentration**, and fuel reformers

L20 ANSWER 31 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI **Fuel cell** system - has reforming device to reform **methanol** to **fuel** gas containing hydrogen and **fuel** **cell** to obtain electromotive force by electrochemical reaction of fuel gas.

L20 ANSWER 32 OF 34 JICST-EPlus COPYRIGHT 2003 JST on STN
TI Study on fuel supplying method and **methanol** **concentration sensor** for the high efficient operation of **methanol fuel cells.**

L20 ANSWER 33 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
TI Fuel concentration control method - and electrode material for recirculating **methanol**-air **fuel cell.**

L20 ANSWER 34 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
TI Fuel concentration **sensors** for fuel cells

=> d all 1-34 l20
YOU HAVE REQUESTED DATA FROM FILE 'CAPLUS, WPIX, COMPENDEX, JICST-EPLUS' -
CONTINUE? (Y)/N:y

L20 ANSWER 1 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 1
AN 2003:511904 CAPLUS
DN 139:55555
TI Infrared sensing of **concentration** of **methanol**'s aqueous solution for a direct **methanol fuel cell**
IN Rabinovich, Arnold; Diatzikis, Evangelos; Mullen, Jeffrey; Tulimieri, Daryl
PA USA
SO U.S. Pat. Appl. Publ., 14 pp.
CODEN: USXXCO
DT Patent
LA English
IC ICM H01M008-00
ICS G01N021-84
NCL 429013000; 073061480
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 80
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 2003124398	A1	20030703	US 2001-33709	20011228
WO 2003058737	A1	20030717	WO 2002-US41626	20021227

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRAI US 2001-33709 A 20011228
AB Systems and methods for IR sensing a compound's concentration in aqueous solution are provided. In various non-limiting embodiments, the invention provides IR sensing of **methanol**'s **concentration** in aqueous solution in connection with a fuel circulation process for a direct **methanol fuel cell.** In some embodiments, flow-through IR sensing technique are provided. In other embodiments, window type IR sensing techniques are provided. As a result of the IR sensing, an accurate real-time measurement of the concentration of a compound of interest in aqueous solution

is affordably obtained.
ST **fuel cell** direct **methanol** IR sensing **concn methanol** aq
IT Flow
(IR sensing of **concentration** of **methanol**'s aqueous solution for direct **methanol fuel cell**)
IT Optical **detectors**
(IR; IR sensing of **concentration** of **methanol**'s aqueous solution for direct **methanol fuel cell**)
IT **Fuel cells**
(direct **methanol**; IR sensing of **concentration** of **methanol**'s aqueous solution for direct **methanol fuel cell**)
IT IR radiation
(transmission; IR sensing of **concentration** of **methanol**'s aqueous solution for direct **methanol fuel cell**)
IT 67-56-1, **Methanol**, uses
RL: ANT (Analyte); TEM (Technical or engineered material use); ANST (Analytical study); USES (Uses)
(IR sensing of **concentration** of **methanol**'s aqueous solution for direct **methanol fuel cell**)

L20 ANSWER 2 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 2
AN 2003:259802 CAPLUS
DN 138:274069
TI Method for determining the concentration of a fluid solution and its application to direct **methanol fuel cell**
IN Ohler, Christian; Killer, Eric; Unternaehrer, Peter
PA ABB Research Ltd., Switz.; E.I. Du Pont De Nemours and Company
SO Eur. Pat. Appl., 8 pp.
CODEN: EPXXDW
DT Patent
LA German
IC ICM G01N009-36
ICS H01M008-04
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 80
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI EP 1298427	A1	20030402	EP 2001-810942	20010927

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR
PRAI EP 2001-810942 20010927
AB The invention concerns a process to determine the concentration of a solution of a solid or a liquid in a solvent, whose d. is different from that of the solid or the liquid In the solution N substances were dipped, where N≥1, and each substance (Kn) has a d. (ρn) which corresponds to the d. of the solution at a definite combination of temperature and concentration From the position of ≥1 substance, the concentration of the dissolved substance in the solution is

obtained. The position of ≥1 substance is **detected** by using a **sensor.** The method is suitable especially for simple and reliable control of **methanol** content in a direct **methanol fuel cell.**

ST **fuel cell** direct **methanol** fluid **concn** detn method

IT Density
Fuel cells
(method for determining concentration of fluid solution and its application to direct **methanol fuel cell**)

IT 67-56-1, **Methanol**, uses
RL: ANT (Analyte); TEM (Technical or engineered material use); ANST (Analytical study); USES (Uses)
(method for determining **concentration** of fluid solution and its application to direct **methanol fuel cell**)

RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Anon; PATENT ABSTRACTS OF JAPAN 1988, V012(023), PP-658
(2) Gfd Geratebau Fur Druckmaschinen; DE 3327252 A 1985
(3) Mitsubishi Electric Corp; JP 62177431 A 1987
(4) Ramona, T; GB 2241582 A 1991
(5) Siemens; WO 0124297 A 2001 CAPLUS
(6) Viola, F; US 4702109 A 1987

L20 ANSWER 3 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
AN 2003:836315 CAPLUS
DN 139:311878
TI Method of measuring **methanol concentration** in an aqueous solution
IN Xie, Tuyu; Chartouni, Daniel; Ohler, Christian
PA Can.
SO U.S. Pat. Appl. Publ., 14 pp.
CODEN: USXXCO
DT Patent
LA English
IC ICM G01N027-406
NCL 205787000; 204421000; 204426000
CC 61-3 (Water)
Section cross-reference(s): 52
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 2003196913	A1	20031023	US 2002-126021	20020419
WO 2003089918	A1	20031030	WO 2002-CA1474	20020930

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH,

CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR,
BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG
PRAI US 2002-126021 A 20020419
AB A method is disclosed for measuring the concentration of a low mol. weight alc.,
such as **methanol**, in an aqueous solution The method uses a **fuel cell sensor** that includes an anode chamber for electrochem. oxidation of the **methanol**, a cathode chamber for electrochem. reduction of oxygen; a proton conducting membrane arranged between the anode and cathode; and a voltmeter operatively connected to the anode and cathode chambers. An aqueous solution of the **methanol** is fed to the anode chamber while the **fuel cell sensor** is operated at an open circuit state, thereby allowing the **methanol** to crossover to the cathode where it is oxidized. The open circuit voltage across the anode and the cathode is measured using the voltmeter and the **concentration** of the **methanol** is determined from the open circuit voltage.
ST methanol detn aq soln
IT Polyoxyalkylenes, analysis
RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
(fluorine- and sulfo-containing, ionomers; **methanol** determination in aqueous solution using **fuel cell sensor**)
IT **Sensors**
(**fuel cell**; **methanol** determination in aqueous solution using **fuel cell sensor**)
IT Fluoropolymers, analysis
RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers; **methanol** determination in aqueous solution using **fuel cell sensor**)
IT Ionomers
RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing; **methanol** determination in aqueous solution using **fuel cell sensor**)
IT **Fuel cells**
(**sensors**; **methanol** determination in aqueous solution using **fuel cell sensor**)
IT 7732-18-5, Water, analysis
RL: AMX (Analytical matrix); ANST (Analytical study)
(**methanol** determination in aqueous solution using **fuel cell sensor**)
IT 67-56-1, **Methanol**, analysis
RL: ANT (Analyte); ANST (Analytical study)
(**methanol** determination in aqueous solution using **fuel cell sensor**)
IT 12779-05-4 66796-30-3, NAFION 117
RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
(**methanol** determination in aqueous solution using **fuel cell sensor**)

L20 ANSWER 4 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
AN 2003:511664 CAPLUS
DN 139:55553
TI Ultrasound sensing of **concentration** of **methanol**'s aqueous solution in direct **methanol fuel cell**
IN Rabinovich, Arnold; Tulimieri, Daryl
PA USA
SO U.S. Pat. Appl. Publ., 10 pp.
CODEN: USXXCO
DT Patent
LA English
IC ICM G01N029-02
NCL 073061450; 073061490; 073061790
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 80
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 2003121315	A1	20030703	US 2001-33416	20011228
WO 2003058235	A1	20030717	WO 2002-US41678	20021223

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRAI US 2001-33416 A 20011228
AB Systems and methods for ultrasound sensing a compound's concentration in aqueous solution are provided. As a result of the ultrasound sensing, an accurate real time measurement of the concentration of the compound of interest in aqueous solution is obtained. In various non-limiting embodiments, the invention provides ultrasound sensing of **methanol**'s **concentration** in aqueous solution in connection with a fuel circulation process for a direct **methanol fuel cell**. Since the speed of sound in a water-**methanol** system increases significantly with **methanol** content, techniques for measuring characteristic sound velocities are used to give sufficient resolution for a fuel circulation process.
ST ultrasound sensing **concn methanol** direct **methanol fuel cell**
IT **Fuel cells**
Piezoelectric transducers
Sensors
Sound and Ultrasound

Transducers
(ultrasound sensing of **concentration** of **methanol**'s aqueous solution in direct **methanol fuel cell**)

IT 67-56-1, **Methanol**, uses
RL: ANT (Analyte); TEM (Technical or engineered material use); ANST (Analytical study); USES (Uses)
(ultrasound sensing of **concentration** of **methanol**'s aqueous solution in direct **methanol fuel cell**)

L20 ANSWER 5 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
AN 2003:472784 CAPLUS
DN 139:9360
TI Indirect measurement of fuel concentration in a liquid feed fuel cell
IN Zhang, Jiujun; Colbow, Kevin M.; Wong, Alfred; Lin, Bruce
PA Can.
SO U.S. Pat. Appl. Publ., 11 pp.
CODEN: USXXCO
DT Patent
LA English
IC ICM G01N025-00
NCL 073061760
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2003110841	A1	20030619	US 2001-33758	20011219
EP 1321995	A2	20030625	EP 2002-28188	20021219

PI
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK

PRAI US 2001-33758 A 20011219

AB In an operating liquid feed **fuel cell** system, fuel concentration in the fuel stream can be calculated as a function of the observed current, the temperature of the fuel stream entering the **fuel cell** stack and the temperature of the **fuel cell** stack itself, thereby eliminating the need for a sep. **sensor.** Typically, **methanol** will be used as the fuel and the liquid feed **fuel cell** system will thus be a direct **methanol fuel cell** system.

ST fuel concn measurement liq feed **fuel cell**; direct **methanol fuel cell** system

IT **Fuel cells**
(direct **methanol**; indirect measurement of **fuel concentration** in liquid feed **fuel cell**)

IT Polyoxyalkylenes, uses
RL: DEV (Device component use); USES (Uses)
(fluorine- and sulfo-containing, ionomers; indirect measurement of fuel concentration in liquid feed fuel cell)

IT Fuels
(**methanol**; indirect measurement of **fuel concentration** in liquid feed **fuel cell**)

IT Fluoropolymers, uses

RL: DEV (Device component use); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers; indirect measurement of fuel concentration in liquid feed fuel cell)

IT Ionomers
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing; indirect measurement of fuel concentration in liquid feed fuel cell)

IT 67-56-1, **Methanol**, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fuels; indirect measurement of fuel concentration in liquid feed **fuel cell**)

IT 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses
RL: CAT (Catalyst use); USES (Uses)
(indirect measurement of fuel concentration in liquid feed fuel cell)

IT 77950-55-1, Nafion 115
RL: DEV (Device component use); USES (Uses)
(indirect measurement of fuel concentration in liquid feed fuel cell)

L20 ANSWER 6 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 2003-344769 [33] WPIX
DNN N2003-275788 DNC C2003-090613
TI Gas **sensor**, for e.g. for measuring concentration of hydrogen gas in fuel gas for use in fuel cell, comprises proton conduction layer, first and second electrodes, reference electrode and diffusion controlling portion.
DC E36 J04 L03 S03 X16
IN ISHIDA, N; KITANOYA, S; KONDO, T; NADANAMI, N; WATANABE, M
PA (NITS) NGK SPARK PLUG CO LTD
CYC 33
PI EP 1288655 A2 20030305 (200333)* EN 14p G01N027-407
R: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI SK TR
CA 2400882 A1 20030303 (200333) EN G01N027-416
JP 2003075404 A 20030312 (200333) 6p G01N027-416
US 2003042139 A1 20030306 (200336) G01N027-407
JP 2003149191 A 20030521 (200342) 7p G01N027-30
ADT EP 1288655 A2 EP 2002-256064 20020902; CA 2400882 A1 CA 2002-2400882 20020829; JP 2003075404 A JP 2001-265756 20010903; US 2003042139 A1 US 2002-231209 20020830; JP 2003149191 A JP 2001-344781 20011109
PRAI JP 2001-344781 20011109; JP 2001-265756 20010903
IC ICM G01N027-30; G01N027-407; G01N027-416
ICS H01M008-04; H01M008-10
AB EP 1288655 A UPAB: 20030526
NOVELTY - A gas **sensor** comprises a proton conduction layer between opposing first and second electrodes, a reference electrode in contact with the proton conduction layer, and a diffusion controlling portion between the first electrode and an atmosphere containing a gas to be measured. The diffusion controlling portion is located away from an end portion of the second electrode in a direction towards the reference electrode and on a side opposite to the reference electrode.
DETAILED DESCRIPTION - A gas **sensor** comprises a proton conduction layer (1), a first electrode (3), a second electrode (5), a

reference electrode (7) in contact with the proton conduction layer, and a diffusion controlling portion (19) between the first electrode and an atmosphere containing a gas to be measured. An object gas component contained in the gas to be measured, which is introduced from the atmosphere via the diffusion controlling portion, is dissociatable, decomposable or reactable through the application of a voltage between the first and second electrodes such that the potential difference between the first electrode and the reference electrode becomes constant to generate protons, and the concentration of the object gas component is obtained on the basis of a limiting current generated as a result of the generated protons being pumped out via the proton conduction layer from the first electrode to the second electrode. The first and second electrodes are opposite each other while the proton conduction layer is held between them, and the diffusion controlling portion is located away from an end portion (T) of the second electrode in a direction towards the reference electrode and on a side opposite to the reference electrode.

An INDEPENDENT CLAIM is included for a further gas **sensor**, similar to that above, in which a first area S1 is an area of a portion of the first electrode on which a projected image of the second electrode is not superimposed when the second electrode is projected onto the first electrode, and a second area S2 is an area of a portion of the second electrode which is superimposed on the first electrode when the second electrode is projected onto the first electrode. The ratio S1/S2 is less than 0.35.

USE - Used as a gas **sensor**, e.g. a hydrogen **sensor**, for measuring the concentration of hydrogen gas in a fuel gas for use in a **fuel cell**, e.g. a polymer electrolyte **fuel cell.**

ADVANTAGE - The diffusion controlling portion is located away from an end portion of the second electrode located on a side towards the reference electrode, in a direction away from the reference electrode, such that an object gas component, e.g. hydrogen introduced from a hydrogen-rich atmosphere, can be pumped before hydrogen reaches a portion of the first electrode which encounters difficulty in pumping hydrogen, preventing the presence of a portion of the first electrode where the concentration of hydrogen is relatively high. In the course of controlling the potential difference between the first electrode and the reference electrode at a constant level, no portion of the first electrode becomes relatively low in concentration of hydrogen, preventing e.g. the dissociation of **methanol**, allowing the **concentration** of an object gas component, e.g. hydrogen, to be accurately measured without the influence of e.g. **methanol.**

DESCRIPTION OF DRAWING(S) - The figure shows a cutaway view of a hydrogen gas **sensor.**

Proton conduction layer 1
First electrode 3
Second electrode 5
Reference electrode 7
Diffusion controlling portions 19

Dwg.1/9

FS CPI EPI
FA AB; GI; DCN

MC CPI: E11-Q03J; E31-A03; J04-C02; J04-C04; L03-E04
EPI: S03-E03B; S03-E14P; X16-C01C; X16-H02

L20 ANSWER 7 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 2003-259183 [26] WPIX
DNN N2003-205447 DNC C2003-067772
TI Process for **regulating** the **methanol concentration** of a direct **methanol fuel cell** system comprises varying a first system parameter, and introducing **methanol** from a **methanol** reservoir depending on the resulting voltage from the fuel solution.
DC E17 J04 X16
IN CHRISTEN, T; OHLER, C
PA (ALLM) ABB RES LTD; (DUPO) DU PONT DE NEMOURS & CO E I
CYC 101
PI EP 1280218 A1 20030129 (200326)* DE 13p H01M008-04
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR
WO 2003012904 A2 20030213 (200326) DE H01M008-04
RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SK SL SZ TR TZ UG ZM ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG US UZ VN YU ZA ZM ZW
ADT EP 1280218 A1 EP 2001-810741 20010727; WO 2003012904 A2 WO 2002-CH382 20020712
PRAI EP 2001-810741 20010727
IC ICM H01M008-04
AB EP 1280218 A UPAB: 20030428
NOVELTY - Process for **regulating** the **methanol concentration** of a direct **methanol fuel cell** system having a **fuel cell** and a separate **methanol** reservoir comprises varying a first system parameter; and introducing **methanol** from a **methanol** reservoir depending on the resulting voltage from the fuel solution.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a process for determining the **methanol concentration** in a direct **methanol fuel cell.**

Preferred Features: Further system parameters are investigated before varying the first system parameter. A gas flow is increased during the variation. The current strength is varied in a determined region and a current-voltage characteristic line is acquired.

USE - Used in a direct **methanol fuel cell**

ADVANTAGE - Additional **methanol** are not required.

Dwg.0/4
FS CPI EPI
FA AB; DCN
MC CPI: E10-E04L1; E11-Q03; E31-N05C; J04-C03
EPI: X16-C09

L20 ANSWER 8 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
AN 2003:248793 CAPLUS
DN 139:9217
TI Reliable and fast-responding **methanol concentration** **sensor** with novel design
AU Qi, Zhigang; He, Chunzhi; Hollett, Mark; Attia, Alan; Kaufman, Arthur
CS H Power Corporation, Belleville, NJ, 07109, USA
SO Electrochemical and Solid-State Letters (2003), 6(5), A88-A90
CODEN: ESLEF6; ISSN: 1099-0062
PB Electrochemical Society
DT Journal
LA English
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
AB A reliable, fast-responding, and low-cost **methanol concn** . **sensor** has been constructed. The **sensor** electrochem. measures the **concentration** of **methanol** solution used in a direct **methanol fuel cell** (DMFC). The novelty of the **sensor** lies in that it comprises a flexible and bendable composite of several layers, which are wrapped around a tube having an aperture that provides fluid contact between the sensing component and the reactant flow stream. Such a **sensor** can be easily incorporated into the **methanol** solution flow loop in a DMFC system.
ST **fuel cell methanol concn** **sensor**
IT **Fuel cells**
Sensors
(reliable and fast-responding **methanol concentration** **sensor** with novel design)
IT 67-56-1, Methanol, analysis
RL: ANT (Analyte); ANST (Analytical study)
(reliable and fast-responding **methanol concentration** **sensor** with novel design)
RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Baldauf, M; J Power Sources 1999, V84, P161 CAPLUS
(2) Barton, S; J Electrochem Soc 1998, V145, P3783 CAPLUS
(3) Heinzel, A; J Power Sources 1999, V84, P70 CAPLUS
(4) Kumagai, T; US 4810597 1989
(5) McNicol, B; J Power Sources 1999, V83, P15 CAPLUS
(6) Narayanan, S; WO 98/45694 1998 CAPLUS
(7) Narayanan, S; US 6306285 B1 2001 CAPLUS
(8) Narayanan, S; Electrochem Solid-State Lett 2000, V3, P117 CAPLUS
(9) Nogami, Y; US 4939467 1990 CAPLUS
(10) Nogami, Y; US 5196801 1993
(11) Scott, K; J Power Sources 1999, V83, P204 CAPLUS
(12) Scott, K; J Power Sources 1999, V79, P43 CAPLUS
(13) Wasmus, S; J Electroanal Chem 1999, V461, P14 CAPLUS
(14) Wohlfarth, C; CRC Handbook of Chemistry and Physics, 75th ed 1994, P6

L20 ANSWER 9 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

AN 2003:600421 CAPLUS
DN 139:216896
TI Study on the methanol permeability in polyacrylamide solid gel membranes
AU Song, Wen-sheng; Li, Lei; Wang, Yu-xin
CS Research Center of Chemical Engineering, School of Chemical Engineeering and Technology, Tianjin University, Tianjin, 300072, Peop. Rep. China
SO Huagong Keji (2003), 11(2), 15-18
CODEN: HUKEFE; ISSN: 1008-0511
PB Huagong Keji Bianjibu
DT Journal
LA Chinese
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
AB Through the method of membrane diffusion, the **methanol** permeability in polyacrylamide (PAAM) solid gel membranes was tested in situ with the differential refractive **detector.** The exptl. results showed that with the increase of PAAM concentration in PAAM solid gel membranes, the **methanol** permeability in PAAM solid gel membranes had an obvious decrease, and with the increase of crosslinking degree in PAAM solid gel membranes in the case of the fixed PAAM **concentration**, the **methanol** permeability in PAAM solid gel membranes brought the min. into existence. Accordingly, PAAM solid gel membranes can be used as **methanol** impermeable electrolyte membranes in direct **methanol fuel cell** (DMFC) after doped elec. conducting components.
ST **methanol** permeability polyacrylamide solid gel membrane; **fuel cell** polyacrylamide solid gel membrane
IT **Fuel cell** electrolytes
(study on **methanol** permeability in polyacrylamide solid gel membranes for potential use in direct **methanol fuel cell**)
IT 67-56-1, **Methanol**, processes 9003-05-8, Polyacrylamide
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(study on **methanol** permeability in polyacrylamide solid gel membranes for potential use in direct **methanol fuel cell**)

L20 ANSWER 10 OF 34 COMPENDEX COPYRIGHT 2003 EEI on STN
AN 2003(21):2720 COMPENDEX
TI Reliable and fast-responding **methanol concentration sensor** with novel design.
AU Qi, Zhigang (H Power Corporation, Belleville, NJ 07109, United States); He, Chunzhi; Hollett, Mark; Attia, Alan; Kaufman, Arthur
SO Electrochemical and Solid-State Letters v 6 n 5 May 2003 2003.p A88-A90
CODEN: ESLEF6 ISSN: 1099-0062
PY 2003
DT Journal
TC Experimental
LA English
AB A reliable, fast-responding, and low-cost **methanol concentration sensor** has been constructed. The **sensor** electrochemically measures the **concentration** of

methanol solution used in a direct **methanol fuel cell** (DMFC). The novelty of the **sensor** lies in that it comprises a flexible and bendable composite of several layers, which are wrapped around a tube having an aperture that provides fluid contact between the sensing component and the reactant flow stream. Such a **sensor** can be easily incorporated into the **methanol** solution flow loop in a DMFC system. 14 Refs.

CC 801.4.1 Electrochemistry; 732.2 Control Instrumentation; 801.1 Chemistry (General); 804.1 Organic Components; 714.1 Electron Tubes; 701.1 Electricity: Basic Concepts and Phenomena

CT *Electrochemical **sensors**; **Fuel cells**; Electrodes; Permittivity; Temperature; Capacitance; **Methanol**

ST **Methanol concentration sensor**; Direct **methanol fuel cell**

L20 ANSWER 11 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 3

AN 2002:466368 CAPLUS

DN 137:35533

TI Apparatus and methods for **sensor**-less optimization of **methanol concentration** in a direct **methanol fuel cell** system

IN Acker, William P.; Sadler, Michael S.; Gottesfeld, Shimshon

PA MTI Microfuel Cells, Inc., USA

SO PCT Int. Appl., 24 pp.
CODEN: PIXXD2

DT Patent

LA English

ICI H01

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 80

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002049125	A2	20020620	WO 2001-US42960	20011120
	W: BA, BB, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EC, EE, ES, FI, GB, ID, IL, IN, JP, KG, KP, KZ, LK, LR, LT, LV, MG, MK, MN, MW, MX, RO, RU, SE, SG, SI, SL, TJ, TM, TR, TT, UA, VN, RU, TJ, TM				
	RW: GH, GM, KE, LS, MZ, SD, SL, TZ, ZW, AT, BE, CH, CY, DK, ES, FI, FR, GB, GR, IE, IT, LU, NL, CF, CG, CI, GA, GN, MR, NE, SN, TD, TG				
	US 6589679	B1	20030708	US 2000-721290	20001122
	AU 2002043210	A5	20020624	AU 2002-43210	20011120
PRAI	US 2000-721290	A	20001122		
	US 2001-40502	A	20011109		
	WO 2001-US42960	W	20011120		

AB Apparatus and methods are disclosed for **regulating methanol concentration** in a direct **methanol fuel cell** system without the need for a **methanol concentration sensor.** One or more operating characteristics of the **fuel cell**, such as the potential across the load, open circuit potential, potential at the anode proximate to the end of the fuel flow path or short circuit current of the **fuel cell**, are used to actively control the **methanol concentration**

ST **fuel cell methanol concn** optimization app

IT **Fuel cells**
Optimization
(apparatus and methods for **sensor**-less optimization of **methanol concentration** in direct **methanol fuel cell** system)

IT 67-56-1, **Methanol**, uses
RL: ANT (Analyte); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); ANST (Analytical study); PROC (Process); USES (Uses)
(apparatus and methods for **sensor**-less optimization of **methanol concentration** in direct **methanol fuel cell** system)

L20 ANSWER 12 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 4
AN 2002:143091 CAPLUS
DN 136:203055
TI **Regulation** of the fuel concentration in the anode fluid of a direct **methanol fuel cell** by determination of carbon dioxide in the exhaust gas of the cathode
IN Preidel, Walter
PA Siemens Aktiengesellschaft, Germany
SO PCT Int. Appl., 15 pp.
CODEN: PIXXD2
DT Patent
LA German
IC ICM H01M008-04
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 79
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002015314	A1	20020221	WO 2001-DE2976	20010803
	W: CA, CN, JP, US				
	RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR				
	DE 10039959	A1	20020307	DE 2000-10039959	20000816
	EP 1310007	A1	20030514	EP 2001-962605	20010803
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY, TR				
	US 2003146094	A1	20030807	US 2003-368154	20030218
PRAI	DE 2000-10039959	A	20000816		
	WO 2001-DE2976	W	20010803		

AB The fuel concentration in the anode fluid of a direct **methanol fuel cell** is **regulated** by determination of carbon dioxide in the exhaust gas of the cathode. A carbon dioxide **sensor** is integrated in the gas stream behind a cooler and a pressure valve. The CO2-concentration is equivalent to the **concentration** of converted **methanol.**

ST direct **methanol fuel cell** carbon dioxide **sensor concn** detn

IT Gas **sensors**
(carbon dioxide; **regulation** of the fuel concentration in the anode fluid of a direct **methanol fuel cell** by determination of carbon dioxide in the exhaust gas of the cathode)
IT Combustion gases
(determination of CO2 in; **regulation** of the fuel concentration in the anode fluid of a direct **methanol fuel cell** by determination of carbon dioxide in the exhaust gas of the cathode)
IT **Fuel cells**
(direct **methanol**; **regulation** of the **fuel concentration** in the anode fluid of a direct **methanol fuel cell** by determination of carbon dioxide in the exhaust gas of the cathode)
IT 124-38-9P, Carbon dioxide, preparation
RL: ANT (Analyte); BYP (Byproduct); ANST (Analytical study); PREP (Preparation)
(determination of; **regulation** of the fuel concentration in the anode fluid of a direct **methanol fuel cell** by determination of carbon dioxide in the exhaust gas of the cathode)
IT 67-56-1, **Methanol**, uses
RL: ANT (Analyte); NUU (Other use, unclassified); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent); USES (Uses)
(determination of; **regulation** of the fuel concentration in the anode fluid of a direct **methanol fuel cell** by determination of carbon dioxide in the exhaust gas of the cathode)
RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anon; PATENT ABSTRACTS OF JAPAN 1991, V015(288), PE-1092
(2) Anon; PATENT ABSTRACTS OF JAPAN 1993, V017(152), PE-1340
(3) Fuji Electric Co Ltd; JP 03101061 A 1991
(4) Mitsubishi Electric Corp; JP 04319263 A 1992
(5) Pantel, K; WO 9750140 A 1997 CAPLUS
(6) Scott, K; JOURNAL OF POWER SOURCES 1999, V79(1), P43 CAPLUS
(7) Toyota Motor Co Ltd; EP 0710996 A 1996 CAPLUS

L20 ANSWER 13 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
AN 2002:449978 CAPLUS
DN 137:22390
TI A **methanol sensor** operated in a driven mode for **fuel cell** use
IN Ren, Xiaoming; Gottesfeld, Shimshon
PA The Regents of the University of California, USA
SO PCT Int. Appl., 15 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM G01N027-406
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 80
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE

PI WO 2002046733 A1 20020613 WO 2001-US44840 20011031
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG
AU 2002017960 A5 20020618 AU 2002-17960 20011031
PRAI US 2000-729735 A 20001204
WO 2001-US44840 W 20011031

AB A **sensor** outputs a **signal** related to the **concn** . of a **methanol** in an aqueous solution The **sensor** includes a membrane electrode assembly (MEA) having a cathode side and an anode side. A cathode current collector supports the cathode side of the MEA and has a flow channel there-through for providing access of the methanol solution to the cathode side of the MEA. An anode current collector supports the anode side of the MEA and is sealed to the MEA to exclude air from the anode side of the MEA. A voltage source is connected to the MEA for electro-oxidation of methanol permeating across MEA from the aqueous methanol solution to produce an output current that is functionally related to the **concentration** of **methanol** in the aqueous solution without interference of air on the methanol oxidation electrode.

ST **fuel cell methanol sensor**

IT **Sensors**
(electrochem.; **methanol sensor** operated in driven mode for **fuel cell** use)

IT **Fuel cells**
Oxidation, electrochemical
(**methanol sensor** operated in driven mode for **fuel cell** use)

IT 67-56-1, **Methanol**, uses
RL: ANT (Analyte); TEM (Technical or engineered material use); ANST (Analytical study); USES (Uses)
(**methanol sensor** operated in driven mode for **fuel cell** use)

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Barton; J Electrochem Soc 1998, V145(11), P3783 CAPLUS
(2) Kring; US 3852169 A 1974 CAPLUS
(3) Tomantschger; US 5302274 A 1994 CAPLUS
(4) van Dine; US 5573866 A 1996 CAPLUS

L20 ANSWER 14 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
AN 2002:72470 CAPLUS
DN 136:105195
TI Method for fabrication of direct **methanol fuel cell** system
IN Koripella, Chowdary Ramesh; Ooms, William Jay; Wilcox, David L.; Bostaph, Joseph W.

PA Motorola, Inc., USA
SO PCT Int. Appl., 28 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM H01M008-00
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2002007241	A2	20020124	WO 2001-US22524	20010717
WO 2002007241	A3	20030904		
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
US 6387559	B1	20020514	US 2000-618399	20000718
TW 508864	B	20021101	TW 2001-90117450	20010717
EP 1358689	A2	20031105	EP 2001-958992	20010717
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY, TR				

PRAI US 2000-618399 A 20000718
WO 2001-US22524 W 20010717

AB A fuel cell system and method of forming the fuel cell system are disclosed including a base portion, formed of a singular body, and having a major surface. At least one fuel cell membrane electrode assembly is formed on the major surface of the base portion. A fluid supply channel including a mixing chamber is defined in the base portion and communicating with the fuel cell membrane electrode assembly for supplying a fuel-bearing fluid to the membrane electrode assembly. An exhaust channel including a water recovery and recirculation system is defined in the base portion and communicating with the membrane electrode assembly. The membrane electrode assembly and the cooperating fluid supply channel and cooperating exhaust channel form a single fuel cell assembly.

ST **fuel cell** direct **methanol** fabrication method
IT **Sensors**
(MeOH **concentration**; method for fabrication of direct **methanol fuel cell** system)
IT Ceramics
(base portion; method for fabrication of direct **methanol fuel cell** system)
IT Glass, uses
Plastics, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(base portion; method for fabrication of direct **methanol fuel cell** system)
IT **Fuel cell** electrodes

Fuel cells
(method for fabrication of direct **methanol fuel cell** system)

IT 7440-21-3, Silicon, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(base portion; method for fabrication of direct **methanol fuel cell** system)

IT 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses 7440-57-5, Gold, uses 11130-73-7, Tungsten carbide
RL: DEV (Device component use); USES (Uses)
(method for fabrication of direct **methanol fuel cell** system)

IT 124-38-9, Carbon dioxide, processes
RL: REM (Removal or disposal); PROC (Process)
(method for fabrication of direct **methanol fuel cell** system)

IT 67-56-1, **Methanol**, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(method for fabrication of direct **methanol fuel cell** system)

L20 ANSWER 15 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
AN 2002:505270 CAPLUS
DN 137:65748
TI Apparatus and methods for **sensor**-less optimization of **methanol concentration** in a direct **methanol fuel cell** system
IN Acker, William P.; Adler, Michael S.; Gottesfeld, Shimshon
PA USA
SO U.S. Pat. Appl. Publ., 14 pp., Cont.-in-part of U. S. Ser. No. 721,290.
CODEN: USXXCO
DT Patent
LA English
IC ICM H01M008-04
NCL 429022000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2002086193	A1	20020704	US 2001-40502	20011109
	US 6589679	B1	20030708	US 2000-721290	20001122
	AU 2002043210	A5	20020624	AU 2002-43210	20011120
PRAI	US 2000-721290	A2	20001122		
	US 2001-40502	A	20011109		
	WO 2001-US42960	W	20011120		

AB Apparatus and methods are disclosed for **regulating methanol concentration** in a direct **methanol fuel cell** system without the need for a **methanol concentration sensor.** One or more operating characteristics of the **fuel cell**, such as the potential across the load, open circuit potential, potential at the anode proximate to the end of the fuel flow

path or short circuit current of the **fuel cell**, are used to actively control the **methanol concentration**

ST sensorless optimization **methanol concn** direct **methanol fuel cell** system

IT Electric potential
Fuel cells
Optimization
(apparatus and methods for **sensor**-less optimization of **methanol concentration** in direct **methanol fuel cell** system)

IT Control apparatus
(micro-; apparatus and methods for **sensor**-less optimization of **methanol concentration** in direct **methanol fuel cell** system)

IT Computers
(microprocessors; apparatus and methods for **sensor**-less optimization of **methanol concentration** in direct **methanol fuel cell** system)

IT 67-56-1, **Methanol**, uses
RL: ANT (Analyte); TEM (Technical or engineered material use); ANST (Analytical study); USES (Uses)
(apparatus and methods for **sensor**-less optimization of **methanol concentration** in direct **methanol fuel cell** system)

L20 ANSWER 16 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
AN 2002:466577 CAPLUS
DN 137:35539
TI Direct **methanol fuel cell** system including an integrated **methanol sensor** and method of fabrication
IN Bostaph, Joseph W.; Koripella, Chowdary R.; Fisher, Allison M.
PA Motorola, Inc., USA
SO U.S. Pat. Appl. Publ., 10 pp.
CODEN: USXXCO
DT Patent
LA English
IC ICM H01M008-04
ICS H01M008-10; H01M004-90; B05D005-12; H01M004-96; H01M004-92
NCL 429022000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 80
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2002076589	A1	20020620	US 2000-738130	20001215
	WO 2002049132	A2	20020620	WO 2001-US44053	20011119
	WO 2002049132	A3	20030327		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL,

PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG,
UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH,
CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR,
BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

AU 2002041511 A5 20020624 AU 2002-41511 20011119
EP 1352441 A2 20031015 EP 2001-988179 20011119
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
IE, SI, LT, LV, FI, RO, MK, CY, AL, TR
TW 531933 B 20030511 TW 2001-90129665 20011130
PRAI US 2000-738130 A 20001215
WO 2001-US44053 W 20011119

AB A **fuel cell** system and method of forming the **fuel cell** system including a base portion, formed of a singular body, and having a major surface are disclosed. At least one **fuel cell** membrane electrode assembly is formed on the major surface of the base portion. A fluid supply channel including a mixing chamber is defined in the base portion and communicating with the **fuel cell** membrane electrode assembly for supplying a fuel-bearing fluid to the membrane electrode assembly. A **methanol concentration sensor** is positioned to communicate with the **fuel cell** membrane electrode assembly and the fuel-supply channel for **regulating** the mixture of fuel to the electrode assembly. An exhaust channel including a water recovery and recirculation system is defined in the base portion and communicating with the membrane electrode assembly.

ST **methanol fuel cell** system integrated **methanol sensor**

IT **Sensors**
(amperometric; direct **methanol fuel cell** system including integrated **methanol sensor** and method of fabrication)

IT Ceramics
(base portion; direct **methanol fuel cell** system including integrated **methanol sensor** and method of fabrication)

IT Glass, uses
Plastics, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(base portion; direct **methanol fuel cell** system including integrated **methanol sensor** and method of fabrication)

IT Conducting polymers
Fuel cell electrodes
Fuel cells
(direct **methanol fuel cell** system including integrated **methanol sensor** and method of fabrication)

IT **Sensors**
(potentiometric; direct **methanol fuel cell** system including integrated **methanol sensor** and method of fabrication)

IT 7440-21-3, Silicon, uses 7782-42-5, Graphite, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(base portion; direct **methanol fuel cell** system including integrated **methanol sensor** and method of fabrication)
IT 67-56-1, **Methanol**, uses
RL: ANT (Analyte); TEM (Technical or engineered material use); ANST (Analytical study); USES (Uses)
(direct **methanol fuel cell** system including integrated **methanol sensor** and method of fabrication)
IT 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses 7440-33-7, Tungsten, uses 7440-57-5, Gold, uses
RL: DEV (Device component use); USES (Uses)
(direct **methanol fuel cell** system including integrated **methanol sensor** and method of fabrication)
IT 7732-18-5, Water, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(direct **methanol fuel cell** system including integrated **methanol sensor** and method of fabrication)

L20 ANSWER 17 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 2002-519821 [55] WPIX
DNN N2002-411430 DNC C2002-147127
TI Direct **methanol fuel cell** system for portable electronic devices, has multiple electrical components in base portion for electrical integration of **fuel cell** assembly with **methanol concentration sensor.**
DC L03 P42 X16
IN BOSTAPH, J W; FISHER, A M; KORIPELLA, C R
PA (MOTI) MOTOROLA INC
CYC 100
PI WO 2002049132 A2 20020620 (200255)* EN 30p H01M008-00
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZM ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PH PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
US 2002076589 A1 20020620 (200255) H01M008-04
AU 2002041511 A 20020624 (200267) H01M008-00
EP 1352441 A2 20031015 (200368) EN H01M008-10
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR
TW 531933 A 20030511 (200372) H01M008-04
ADT WO 2002049132 A2 WO 2001-US44053 20011119; US 2002076589 A1 US 2000-738130 20001215; AU 2002041511 A AU 2002-41511 20011119; EP 1352441 A2 EP 2001-988179 20011119, WO 2001-US44053 20011119; TW 531933 A TW 2001-129665 20011130

FDT AU 2002041511 A Based on WO 2002049132; EP 1352441 A2 Based on WO 2002049132
PRAI US 2000-738130 20001215
IC ICM H01M008-00; H01M008-04; H01M008-10
ICS B05D005-12; H01M004-90; H01M004-92; H01M004-96; H01M008-24
AB WO 200249132 A UPAB: 20020829
NOVELTY - Exhaust channel (38) in base portion (14) with electrical components for integration of **fuel cell** assembly, is spaced from fluid supply channel (32) and ejects fluid from **fuel cell** membrane electrode assembly. **Methanol concentration sensor** (39) is connected to **fuel cell** membrane electrode assembly and channel (32) which in combination with exhaust channel form single **fuel cell** assembly (12).

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

(1) **fuel cell** array apparatus; and

(2) **fuel cell** array apparatus fabricating method.

USE - For supplying power to portable electronic device.

ADVANTAGE - The system is semi-self contained system which is not orientation sensitive and hence it is easily movable. The provision of **sensor** enables to **regulate methanol concentration** in supplied fuel.

DESCRIPTION OF DRAWING(S) - The figure shows the simplified sectional view of direct **methanol fuel cell** system.

Fuel cell assembly 12
Base portion 14
Fluid supply channel 32
Exhaust channel 38
Methanol concentration sensor 39

Dwg.1/6
FS CPI EPI GMPI
FA AB; GI
MC CPI: L03-E04
EPI: X16-C

L20 ANSWER 18 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 2002-547777 [58] WPIX
DNN N2002-433653 DNC C2002-155354
TI **Methanol concentration sensor**, for use with fuel supply, comprises membrane electrode, anode and cathode current collector, and current **sensor** to measure current to provide **signal.**
DC E17 J04 S03 X16
IN GOTTESFELD, S; REN, X
PA (REGC) UNIV CALIFORNIA
CYC 95
PI WO 2002046732 A1 20020613 (200258)* EN 12p G01N027-406
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ

LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD
SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
AU 2002017958 A 20020618 (200262) G01N027-406
US 6488837 B1 20021203 (200301) G01N027-406
ADT WO 2002046732 A1 WO 2001-US44836 20011031; AU 2002017958 A AU 2002-17958 20011031; US 6488837 B1 US 2000-730142 20001204
FDT AU 2002017958 A Based on WO 2002046732
PRAI US 2000-730142 20001204
IC ICM G01N027-406
ICS H01M010-48
AB WO 200246732 A UPAB: 20020910
NOVELTY - **Sensor** for outputting **signal** for **concentration** of **methanol** in aqueous solution comprises membrane electrode with anode and cathode sides, an anode current collector with a flow channel for the solution and to control access of the **methanol** to the anode side, a cathode current collector allowing access of air over the cathode side, and a current **sensor** to measure current in a short circuit across the electrodes to provide the **signal.**

DETAILED DESCRIPTION - **Sensor** for outputting **signal** for **concentration** of **methanol** in aqueous solution comprises membrane electrode with anode and cathode sides for **methanol** oxidation and oxygen reduction respectively, an anode current collector supporting the anode side with a flow channel to flow a stream of the solution and form a physical barrier to control access of the **methanol** to the anode side, a cathode current collector supporting the cathode side and allowing access of air over the cathode side, and a current **sensor** to measure current in a short circuit across the electrodes to provide a **signal** that may be related to the concentration..

An INDEPENDENT CLAIM is included for a method for determining the **concentration** of **methanol** in an aqueous solution using the above **sensor.**

USE - For sensing **methanol concentration** in direct **methanol fuel cell** power system.

ADVANTAGE - The **sensor** is self driven and shows a good linear response to the **methanol concentration** range used in direct **methanol fuel cells.**

Dwg.0/3
FS CPI EPI
FA AB; DCN
MC CPI: E10-E04L1; E11-Q03J; J04-C02
EPI: S03-E03A; S03-E03C; X16-C; X16-H02

L20 ANSWER 19 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 2002-731506 [79] WPIX
DNN N2002-576667
TI **Fuel cell** system e.g. direct **methanol fuel cell** system increases **fuel concentration** at anode and increases oxidation of crossover fuel at cathode when **regulator** temperature is below specified range.
DC X16

IN ACKER, W P; DAILEY, W W; GOTTESFELD, S
PA (ACKE-I) ACKER W P; (DAIL-I) DAILEY W W; (GOTT-I) GOTTESFELD S; (MTIM-N) MTI MICROFUEL CELLS INC
CYC 100
PI US 2002122966 A1 20020905 (200279)* 16p H01M008-04
WO 2002071520 A1 20020912 (200279) EN H01M008-00
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZM ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG UZ VN YU ZA ZM ZW
ADT US 2002122966 A1 US 2001-798314 20010302; WO 2002071520 A1 WO 2002-US4161 20020213
PRAI US 2001-798314 20010302
IC ICM H01M008-00; H01M008-04
ICS H01M004-00; H01M008-12
AB US2002122966 A UPAB: 20021209
NOVELTY - A membrane electrolyte (103) is arranged between an anode (104) and a cathode (102). A temperature **regulator** is connected to a fuel source and the anode. The **regulator** increases fuel concentration at anode to promote fuel crossover through the membrane and increases oxidation of crossover fuel at cathode when the **regulator** temperature is below a specified range.
DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for temperature control method.
USE - For e.g. direct **methanol fuel cell** system.
ADVANTAGE - By increasing amount of fuel to the cathode, the temperature is increased and hence cold start' performance of the **fuel cell** is improved.
DESCRIPTION OF DRAWING(S) - The figure shows the block diagram of the direct **methanol fuel cell** power system.
Cathode 102
Membrane electrolyte 103
Anode 104
Dwg.3/9
FS EPI
FA AB; GI
MC EPI: X16-C09; X16-C15; X16-K

L20 ANSWER 20 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 2002-588548 [63] WPIX
CR 2002-105034 [14]; 2003-352063 [33]; 2003-465720 [44]
DNN N2002-466899 DNC C2002-166566
TI Generation of hydrogen used as **fuel**, involves electro-oxidizing **methanol** at anode in electrolytic **cell** to form protons and electro-reducing protons at cathode to form hydrogen.
DC A97 E36 J03 X25
IN CHUN, W; JEFFRIES-NAKAMURA, B; NARAYANAN, S R; VALDEZ, T I
PA (CALY) CALIFORNIA INST OF TECHNOLOGY
CYC 1

PI US 6368492 B1 20020409 (200263)* 11p C25B001-02
ADT US 6368492 B1 Cont of US 1997-926947 19970910, Div ex US 1998-123957 19980728, US 2000-506170 20000217
PRAI US 1997-926947 19970910; US 1998-123957 19980728; US 2000-506170 20000217
IC ICM C25B001-02
AB US 6368492 B UPAB: 20030710
NOVELTY - Method for generating hydrogen gas involves circulating **methanol** and water around anode (112) of electrolytic cell (102) comprising polymeric electrolyte membrane (110) disposed between anode and cathode (114), supplying DC electrical current to anode and cathode, inducing electro-oxidation of **methanol** at anode to produce protons, and initiating electro-reduction of protons at cathode to produce hydrogen.

USE - Used as fuel for hydrogen/oxygen **fuel cells** for producing electrical energy which is used to power an electrically driven device such as electrical vehicles and engines. The hydrogen generators can be used on-site in metallurgical process for annealing, reduction and alloy processing; and for gas chromatograph, flame ionization **detectors** in analytical laboratories.

ADVANTAGE - **Methanol** can be electrolyzed to hydrogen and carbon dioxide at a low operating voltage of 0.4 V. Hence energy consumption and production cost of hydrogen (including **methanol** cost) are reduced by more than 70% and 50%, respectively when compared the energy consumption and production cost of hydrogen produced by electrolyzing water. The solid membrane electrolytic cell in the electrolytic cell eliminates the conventional liquid acidic or alkaline electrolyte which causes various problems including corrosion of cell components, poor activity of catalysts, and parasitic shunt currents. The solid membrane electrolytic cell is robust and compact. The electrolytic cell is free of potassium hydroxide, hence resists performance degradation due to the formation of soluble carbonates. The electrolytic cells can be used in a portable or stationery mode for small and large-scale hydrogen generators. The hydrogen generators can be coupled with solar cell to efficiently harness solar energy.

DESCRIPTION OF DRAWING(S) - The figure shows the hydrogen generator comprising electrolytic cell having solid state membrane electrolyte.

Electrolytic cell 102
Membrane 110
Anode 112
Cathode 114
Dwg.1/5

FS CPI EPI
FA AB; GI; DCN
MC CPI: A12-E06B; E11-N; E31-A02; J03-B; N07-G
EPI: X25-R01A

L20 ANSWER 21 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 2003-055173 [05] WPIX
TI Fuel supply device and method in fuel cell.
DC X16
IN HWANG, Y J; KIM, H D; KIM, I G; LEE, M H; LEE, S H; PARK, I G; PARK, M S;

YOON, H S
PA (GLDS) LG ELECTRONICS INC
CYC 1
PI KR 2002056137 A 20020710 (200305)* 1p H01M008-04
ADT KR 2002056137 A KR 2000-85445 20001229
PRAI KR 2000-85445 20001229
IC ICM H01M008-04
AB KR2002056137 A UPAB: 20030121
NOVELTY - Provided are a fuel supply device which is suitable to maintain the **concentration** of mixed **methanol** solution stored in fuel storage tank at constant level, and a method for fuel supply in the device.
DETAILED DESCRIPTION - The fuel supply device in **fuel cell** comprises a stack(10) which comprises a cathode and an anode. In the device, mixed **methanol** solution(41) which is supplied from a storage tank(42) of the mixed **methanol** solution to the anode by liquid fuel supply line(43), is electrochemically reacted with air supplied to the cathode to form electromotive force. The device comprises a concentration **sensor**(51) for **detecting** the **concentration** of the mixed **methanol** solution; a water supply unit(52) which consists of water storage tank(62), water supply line(63) and valve; and a **methanol** supply unit(53) which consists of a **methanol** storage tank(72), a **methanol** supply line(73) and a valve.
Dwg.1/10
FS EPI
FA AB; GI
MC EPI: X16-C09

L20 ANSWER 22 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 2003-055172 [05] WPIX
TI Fuel supply device in fuel cell.
DC X16
IN HWANG, Y J; KIM, H D; KIM, I G; LEE, M H; LEE, S H; PARK, I G; PARK, M S; YOON, H S
PA (GLDS) LG ELECTRONICS INC
CYC 1
PI KR 2002056136 A 20020710 (200305)* 1p H01M008-04
ADT KR 2002056136 A KR 2000-85444 20001229
PRAI KR 2000-85444 20001229
IC ICM H01M008-04
AB KR2002056136 A UPAB: 20030121
NOVELTY - Provided is a fuel supply device which is suitable to **detect** the **concentration** of mixed **methanol** solution stored in fuel storage tank and maintain the **concentration** of the mixed **methanol** solution at appropriate level.
DETAILED DESCRIPTION - The fuel supply device in **fuel cell**(in the **fuel cell**, liquid fuel is supplied to electrode, and an electromotive force is generated by chemical reaction of the liquid fuel) comprises an absorbance **sensor** for **detecting** the concentration change and the consumption state of

the liquid fuel by **detecting** an absorbance difference of the liquid fuel. The absorbance **sensor** consists of a luminescent **sensor**(45) for light-emitting; a photosensor(45') for receiving ultraviolet; an electronic controller(46) for logical calculation of data; and a display unit(47) for displaying the result of the controller(46).
Dwg.1/10
FS EPI
FA AB; GI
MC EPI: X16-C09

L20 ANSWER 23 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 2003-055171 [05] WPIX
TI Fuel supply device in fuel cell.
DC X16
IN HWANG, Y J; KIM, H D; KIM, I G; LEE, M H; LEE, S H; PARK, I G; PARK, M S; YOON, H S
PA (GLDS) LG ELECTRONICS INC
CYC 1
PI KR 2002056135 A 20020710 (200305)* 1p H01M008-04
ADT KR 2002056135 A KR 2000-85443 20001229
PRAI KR 2000-85443 20001229
IC ICM H01M008-04
AB KR2002056135 A UPAB: 20030121
NOVELTY - Provided is a fuel supply device which is suitable to **detect** the **concentration** of mixed **methanol** solution stored in fuel storage tank and maintain the **concentration** of the mixed **methanol** solution at appropriate level.
DETAILED DESCRIPTION - The fuel supply device in **fuel cell**(in the **fuel cell**, liquid fuel is supplied to electrode, and an electromotive force is generated by chemical reaction of the liquid fuel) comprises a **sensor** for **detecting** the concentration change and the consumption state of the liquid fuel by **detecting** conductivity difference of the liquid fuel. The **sensor** consists of a conductivity **sensor**(45) for **detecting** conductivity; an electronic controller(46) for logical calculation of data and value **detected** in **sensor**(45); and a display unit(47) for displaying the result of the controller(46).
Dwg.1/10
FS EPI
FA AB; GI
MC EPI: X16-C09

L20 ANSWER 24 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
AN 2001:360323 CAPLUS
DN 134:355479
TI **Fuel cell** (**methanol**) **sensor** with small load resistance and high oxidant supply
IN Zhang, Jiujun; Colbow, Kevin M.; Wilkinson, David P.; Muller, Jens
PA Ballard Power Systems Inc., Can.
SO PCT Int. Appl., 38 pp.
CODEN: PIXXD2

DT Patent
LA English
IC ICM H01M008-04
ICS G01N027-49
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001035478	A1	20010517	WO 2000-CA1240	20001024
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	US 6527943	B1	20030304	US 1999-435977	19991108
PRAI	US 1999-435977	A	19991108		

AB The measuring range of a **fuel cell** based concentration **sensor** can be extended by decreasing the load across the **fuel cell** terminals and by increasing the amount of oxidant supplied to the **fuel cell.** In this way, such a **sensor** avoids saturation, for example, when measuring **methanol concns.** from 0M to over 4M in liquid aqueous solution Such a **sensor** is suitable for use in measuring fuel concns. in the recirculating fuel stream of certain **fuel cell** stacks (for example, direct **methanol fuel cell** stacks).

ST **fuel cell methanol concn sensor**

IT Catalysts
(electrocatalysts; **fuel cell** (**methanol**) **sensor** with small load resistance and high oxidant supply)

IT Polyoxyalkylenes, uses
RL: DEV (Device component use); USES (Uses)
(fluorine- and sulfo-containing, ionomers; **fuel cell** (**methanol**) **sensor** with small load resistance and high oxidant supply)

IT **Fuel cells**
Sensors
(**fuel cell** (**methanol**) **sensor** with small load resistance and high oxidant supply)

IT Alcohols, uses
Aldehydes, uses
Esters, uses
Ethers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(**fuel cell** (**methanol**) **sensor** with small load resistance and high oxidant supply)

IT Carbon fibers, uses

RL: TEM (Technical or engineered material use); USES (Uses)
(paper, substrate; **fuel cell (methanol) sensor** with small load resistance and high oxidant supply)

IT Fluoropolymers, uses
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers; **fuel cell (methanol) sensor** with small load resistance and high oxidant supply)

IT Ionomers
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing; **fuel cell (methanol) sensor** with small load resistance and high oxidant supply)

IT 67-56-1, **Methanol**, uses
RL: ANT (Analyte); TEM (Technical or engineered material use); ANST (Analytical study); USES (Uses)
(**fuel cell (methanol) sensor** with small load resistance and high oxidant supply)

IT 7440-06-4, Platinum, uses 12779-05-4
RL: CAT (Catalyst use); USES (Uses)
(**fuel cell (methanol) sensor** with small load resistance and high oxidant supply)

IT 7782-42-5, Graphite, uses 66796-30-3, Nafion 117
RL: DEV (Device component use); USES (Uses)
(**fuel cell (methanol) sensor** with small load resistance and high oxidant supply)

IT 64-17-5, Ethanol, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(**fuel cell (methanol) sensor** with small load resistance and high oxidant supply)

RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD

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(2) Criddle, W; SELECTIVE ELECTRODE REVIEWS 1992, V14(2), P195 CAPLUS
(3) Hong, Y; SENSORS AND ACTUATORS B 1996, VB32(1), P7 CAPLUS
(4) Kumagai, T; US 4810597 A 1989
(5) Luft, G; US 5624538 A 1997 CAPLUS
(6) Oetjen, H; WO 0046869 A 2000 CAPLUS
(7) Tantram, A; US 4132616 A 1979 CAPLUS
(8) Wolfe, W; US 3852169 A 1974 CAPLUS

L20 ANSWER 25 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 2001-245951 [26] WPIX
DNN N2001-175048 DNC C2001-074131
TI Determining fuel concentration in electrolyte of fuel cell comprises measuring capacity of capacitor, calculating dielectric constant and determining fuel concentration.
DC E17 J04 S01 S03 X16
IN FRANK, M
PA (SIEI) SIEMENS AG; (FRAN-I) FRANK M
CYC 23

PI DE 19938790 A1 20010222 (200126)* 3p H01M008-04
WO 2001013451 A1 20010222 (200126) DE H01M008-04
RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
W: CA CN JP US
EP 1206808 A1 20020522 (200241) DE H01M008-04
R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
US 2002109511 A1 20020815 (200256) G01R027-26
JP 2003507859 W 20030225 (200317) 11p H01M008-04
ADT DE 19938790 A1 DE 1999-19938790 19990816; WO 2001013451 A1 WO 2000-DE2771 20000816; EP 1206808 A1 EP 2000-962223 20000816, WO 2000-DE2771 20000816; US 2002109511 A1 Cont of WO 2000-DE2771 20000816, US 2002-78123 20020219; JP 2003507859 W WO 2000-DE2771 20000816, JP 2001-517449 20000816
FDT EP 1206808 A1 Based on WO 2001013451; JP 2003507859 W Based on WO 2001013451
PRAI DE 1999-19938790 19990816
IC ICM G01R027-26; H01M008-04
ICS G01N027-22
AB DE 19938790 A UPAB: 20010515
NOVELTY - Determining the fuel concentration in the electrolyte of a **fuel cell** operated with liquid fuel comprises measuring the capacity of a capacitor using the fuel/electrolyte mixture as dielectric, calculating the dielectric constant of the mixture and determining the fuel concentration.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a device for carrying out the process comprising a capacitor through which the fuel/electrolyte mixture flows, and devices for measuring the capacity, calculating the dielectric constant and determining the fuel concentration.

Preferred Features: The capacity is measured at a frequency of more than 20 kHz. The fuel/electrolyte mixture is a **methanol**/water mixture. The capacitor is a plate capacitor. A reference capacitor with a dielectric in the theoretical concentration region is additionally used.

USE - For determining the **concentration** of **methanol** in the electrolyte of direct **methanol fuel cells.**

ADVANTAGE - The process is simple and can be integrated into a closed **regulating** cycle.

Dwg.0/0
FS CPI EPI
FA AB; DCN
MC CPI: E10-E04L1; E11-Q03F; J04-C03
EPI: S01-D05A; S03-E02C; X16-C09; X16-H02

L20 ANSWER 26 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
AN 2001:651990 CAPLUS
DN 136:88274
TI Plasma polymerized barrier films on membranes for direct **methanol fuel cells**
AU Feichtinger, J.; Galm, R.; Walker, M.; Baumgartner, K.-M.; Schulz, A.; Rauchle, E.; Schumacher, U.
CS Institut fur Plasmaforschung der Universitat Stuttgart, Stuttgart, D-70569, Germany

SO Surface and Coatings Technology (2001), 142-144, 181-186
CODEN: SCTEEJ; ISSN: 0257-8972
PB Elsevier Science S.A.
DT Journal
LA English
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 42
AB **Methanol** permeation through Nafion-type membranes suitable for use in a direct **methanol fuel cell** was investigated at different **concns.** of **methanol** in aqueous solns. Thin plasma polymerized barrier films were deposited on Nafion membranes in a low-pressure microwave-generated plasma to reduce their **methanol** permeability. Hydrocarbon coatings were produced by plasma deposition of a hexane-H2 plasma; fluorocarbon coatings were produced from a tetrafluoroethane plasma. **Methanol** permeability was measured as a function of time using a gas chromatograph with a flame ionization **detector.** A plasma polymer layer with a thickness of approx. 0.27 μm on Nafion 117 membrane reduced the permeability to **methanol** by a factor of .apprx.20.
ST plasma polymd barrier film **methanol fuel cell** ; permeability **methanol fuel cell** plasma coating; vapor deposition permeability coating **methanol fuel cell**
IT Hydrocarbons, uses
RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(coating, plasma-induced; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
IT Polyoxyalkylenes, uses
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(fluorine- and sulfo-containing, ionomers, membranes; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
IT Hydrocarbons, uses
RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(fluoro, coating, plasma-induced; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
IT **Fuel cells**
(**methanol**-fed; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
IT **Fuel cell** separators
Membranes, nonbiological
(**methanol**-permeable; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)
IT Permeability

(of **methanol**; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)

IT Vapor deposition process
(plasma; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)

IT Fluoropolymers, uses
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers, membranes; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)

IT Ionomers
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing, membranes; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)

IT 67-56-1, **Methanol**, uses
RL: DEV (Device component use); PRP (Properties); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)
(fuel; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)

IT 66796-30-3, Nafion 117
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(membrane; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)

IT 110-54-3, Hexane, reactions 29759-38-4, Tetrafluoroethane
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PYP (Physical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(plasma reactions of; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)

IT 1333-74-0, Hydrogen, reactions
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PYP (Physical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(plasma-induced hexane reactions of; plasma-polymerized deposition of low-permeability coatings for **methanol** in direct-**methanol fuel cells**)

RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Anon; DE 19503205 C1 1995 CAPLUS
(2) Baddour, R; J Appl Polym Sci 1964, V8, P897 CAPLUS
(3) Comyn, J; Polymer Permeability 1988
(4) DuPont; Nafion Perfluorinated Membranes; Technical Information 1993
(5) Fowkes, F; Contact Angle, Wettability and Adhesion 1964
(6) Kaelble, D; Physical Chemistry of Adhesion 1971
(7) Kaiser, M; Surf Coat Technol 1999, V116/119, P552

(8) Pu, C; J Electrochem Soc 1995, V142(7), P119
(9) Ren, X; Electrochem Soc 1995, V95(23), P284
(10) Walker, M; Acta Polym 1996, V47, P466
(11) Walker, M; Doctoral Thesis, Universitat Stuttgart 1996
(12) Walker, M; J Appl Polym Sci 1997, V64, P717 CAPLUS
(13) Walker, M; Surf Coat Technol 1999, V116/119, P996

L20 ANSWER 27 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 5
AN 2000:119554 CAPLUS
DN 132:139773
TI Design and operation of an electrochemical **methanol concentration sensor** for direct **methanol fuel cell** systems
AU Narayanan, S. R.; Valdez, T. I.; Chun, W.
CS Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, 91109, USA
SO Electrochemical and Solid-State Letters (2000), 3(3), 117-120
CODEN: ESLEF6; ISSN: 1099-0062
PB Electrochemical Society
DT Journal
LA English
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 76
AB The design and operation of a **methanol concentration sensor** suitable for use with direct **methanol fuel cells** is described. The sensing principle is based on the measurement of concentration-dependent oxidation currents for the electro-oxidation of **methanol** in a polymer electrolyte membrane cell at a platinum-ruthenium electrode. The device construction and properties are described. The **sensor** was integrated with an automatic fuel feed system, and was operated for several tens of hours. The results demonstrate that the **sensor** is robust and sensitive enough to meet the demands of **concentration** sensing and control in direct **methanol fuel cell** systems.
ST electrochem **methanol concn sensor fuel cell**
IT **Fuel cells**
(design and operation of electrochem. **methanol concn . sensor** for direct **methanol fuel cell** systems)
IT **Sensors**
(electrochem.; design and operation of electrochem. **methanol concentration sensor** for direct **methanol fuel cell** systems)
RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

(1) Calabrese Barton, S; J Electrochem Soc 1998, V145, P3783
(2) Kosek, J; 1998 Fuel Cell Seminar Abstracts 1998, P693
(3) Narayanan, S; 1998 Fuel Cell Seminar Abstracts 1998, P707
(4) Narayanan, S; Proceedings of the 38th Power Sources Conference 1998, P461 CAPLUS
(5) Narayanan, S; Proton Conducting Fuel Cells I, The Electrochemical Society

Proceedings Series 1995, PV 95-23, P261
(6) Narayanan, S; Proton Conducting Fuel Cells I, The Electrochemical Society Proceedings Series 1995, PV 95-23, P278
(7) Ren, X; J Electrochem Soc 1996, V143, PL12 CAPLUS
(8) Surampudi, S; J Power Sources 1994, V47, P377 CAPLUS
(9) Valdez, T; Proton Conducting Fuel Cells II, The Electrochemical Society Proceedings Series 1998, PV 98-27, P380
(10) Zelenay, P; Proton Conducting Fuel Cells II, The Electrochemical Society Proceedings Series 1998, PV 98-27, P300

L20 ANSWER 28 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN DUPLICATE 6
AN 1998:685105 CAPLUS
DN 129:304377
TI **Methanol concentration sensor** for aqueous environments such as liquid direct-feed **fuel cells.**
IN Narayanan, Sekharipuram R.; Chun, William; Valdez, Thomas I.
PA California Institute of Technology, USA
SO PCT Int. Appl., 32 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM G01N027-406
CC 51-3 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 52, 80
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 9845694	A1	19981015	WO 1998-US7244	19980407
W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
US 6306285	B1	20011023	US 1998-56054	19980406
AU 9868981	A1	19981030	AU 1998-68981	19980407
EP 1018000	A1	20000712	EP 1998-914680	19980407
R: DE, GB				

PRAI US 1997-41872P P 19970408
US 1998-56054 A 19980406
WO 1998-US7244 W 19980407

AB An analyte concentration **sensor** that is capable of fast and reliable sensing of analyte concentration in aqueous environments with high concns. of the analyte. Preferably, the present invention is a **methanol concentration sensor** device coupled to a fuel metering control system for use in a liquid direct-feed **fuel cell.**

ST **methanol** detn water **fuel cell sensor**

IT Plastics, uses
RL: DEV (Device component use); USES (Uses)

(conductive or metalized; **methanol concentration sensor** for aqueous environments such as liquid direct-feed **fuel cells.**)

IT **Fuel cells**
(liquid direct-feed; **methanol concentration sensor** for aqueous environments such as liquid direct-feed **fuel cells.**)

IT Process control
(**methanol concentration sensor** for aqueous environments such as liquid direct-feed **fuel cells.**)

IT Ethers, uses
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(**methanol concentration sensor** for aqueous environments such as liquid direct-feed **fuel cells.**)

IT 7732-18-5, Water, analysis
RL: AMX (Analytical matrix); ANST (Analytical study)
(**methanol concentration sensor** for aqueous environments such as liquid direct-feed **fuel cells.**)

IT 67-56-1, **Methanol**, analysis
RL: ANT (Analyte); ANST (Analytical study)
(**methanol concentration sensor** for aqueous environments such as liquid direct-feed **fuel cells.**)

IT 50-00-0, Formaldehyde, uses 64-17-5, Ethanol, uses 64-18-6, Formic acid, uses 64-19-7, Acetic acid, uses 75-07-0, Acetaldehyde, uses 109-87-5, Dimethoxymethane 110-00-9D, Furan, derivs. 110-88-3, Trioxane, uses 149-73-5, Trimethoxymethane 616-38-6, Dimethyl carbonate
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(**methanol concentration sensor** for aqueous environments such as liquid direct-feed **fuel cells.**)

IT 7440-06-4, Platinum, uses 7440-32-6, Titanium, uses 7440-57-5, Gold, uses 7782-42-5, Graphite, uses 12597-68-1, Stainless steel, uses 25583-20-4, Titanium nitride
RL: DEV (Device component use); USES (Uses)
(**methanol concentration sensor** for aqueous environments such as liquid direct-feed **fuel cells.**)

RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Buzza; US 4003705 A 1977 CAPLUS
(2) Holden; US 3410780 A 1968 CAPLUS
(3) La Conti; US 4025412 A 1977 CAPLUS
(4) MC Elroy; US 5118398 A 1992 CAPLUS
(5) Meysson; US 3464008 A 1969
(6) Neti; US 4575410 A 1986 CAPLUS
(7) Razaq; US 5322602 A 1994 CAPLUS
(8) Smith; US 3480520 A 1969 CAPLUS
(9) Surampudi; US 5599638 A 1977 CAPLUS
(10) Tomantschger; US 5173166 A 1992 CAPLUS

L20 ANSWER 29 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 1998-558669 [48] WPIX
DNN N1998-435585 DNC C1998-167355

TI New perovskite-type solid electrolyte - has alkaline earth metal sites occupied by barium and rare earth metal sites occupied by praseodymium and another rare earth metal.
DC L03 S03 X16
IN FUKUI, T; KAWATSU, S; OGAWA, M; OHARA, S
PA (NIFI-N) JAPAN FINE CERAMICS CENT; (TOYT) TOYOTA JIDOSHA KK; (AICI) AICHI SEIKO KK; (TOYX) TOYODA AUTOMATIC LOOM WORKS; (FINE-N) ZH FINE CERAMICS CENT
CYC 3
PI DE 19814106 A1 19981022 (199848)* DE 62p H01M008-12
JP 10284108 A 19981023 (199902) 41p H01M008-12
CA 2232737 A 19980930 (199910) H01M008-02
ADT DE 19814106 A1 DE 1998-19814106 19980330; JP 10284108 A JP 1997-98072 19970331; CA 2232737 A CA 1998-2232737 19980319
PRAI JP 1997-98072 19970331
IC ICM H01M008-02; H01M008-12
ICS B01D057-02; C01B003-24; C01F017-00; G01N027-407; G01N027-409; H01B001-06; H01M008-06; H01M008-10; H01M008-24
AB DE 19814106 A UPAB: 19981210
A novel solid electrolyte has a perovskite structure which contains either (a) alkaline earth metal sites occupied by barium, rare earth metal sites occupied by praseodymium and another rare earth metal (preferably gadolinium or cerium and another rare earth metal, preferably gadolinium), and oxygen; or (b) alkaline earth metal sites occupied by barium and another alkaline earth metal (preferably magnesium or calcium), rare earth metal sites occupied by cerium and another rare earth metal (preferably gadolinium or praseodymium and another rare earth metal, preferably gadolinium), and oxygen. Also claimed are (i) solid ceramic **fuel cells**, direct **methanol fuel cells**, hydrogen pumps, oxygen **concentration sensors**, vapour concentration **sensors** and **fuel cell** systems containing the above solid electrolyte; (ii) a direct **methanol fuel cell** including a proton conductive solid electrolyte formed by sintering a mixture of metal compounds, at least one of which is a metal oxide; and (iii) hydrogen separation and supply equipment which has a hydrogen pump including the above solid electrolyte.

USE - For **fuel cells**, hydrogen pumps and oxygen and vapour concentration **sensors.**

ADVANTAGE - The solid electrolyte has excellent proton and oxygen ion conductivity and can be used at lower temperatures (e.g. 400-700 deg. C) than conventional solid electrolytes so that special heat resistant materials are not required for e.g. **fuel cell** construction.

Dwg.11/28
FS CPI EPI
FA AB; GI
MC CPI: L03-E04A
EPI: S03-E03C; X16-C01A; X16-J01C

L20 ANSWER 30 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
AN 1997:505246 CAPLUS
DN 127:193067

TI Manufacture of noble metal catalysts, apparatus for reducing carbon monoxide **concentration**, apparatus for reducing **methanol concentration**, and fuel reformers

IN Aoyama, Satoshi
PA Toyota Motor Corp., Japan

SO Jpn. Kokai Tokkyo Koho, 15 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01M008-06
ICS H01M008-06; B01J023-38; B01J023-46; C01B003-40; C01B003-58
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 09199156	A2	19970731	JP 1996-28662	19960122

PRAI JP 1996-28662 19960122

AB The catalysts are prepared by adsorbing noble metal salts on a support and reducing the salt in a H atmospheric, where temperature during the reduction is adjusted to **regulate** the particle size of the noble metal on the support. Particle size of Ru on Al2O3 is **regulated** with 0.3-10 and 10-100 nm by adjusting the reduction temperature at 200-400 and 400-900°, resp. Apparatus for reducing CO concentration in a H rich gas includes a means for supplying an O containing oxidant gas to the H rich gas and a selective oxidation chamber containing a catalyst having 0.3-10 nm Ru particles loaded on a support. Apparatus for reducing MeOH concentration in a H rich gas, having MeOH concentration lower than H concentration, includes a means for supplying an O containing oxidant gas the the H rich gas and a selective oxidation chamber containing a catalyst having 10-100 nm Ru particles loaded on a support. The reformers have a reforming section, means for **detecting** CO and/or MeOH concentration in the reformed gas, the above described CO and/or MeOH concentration reducing apparatus, and means controlling the oxidant gas supply of the apparatus depending on the monitored concns. The reformers are suitable for fuel cell power plants.

ST **fuel cell** reformed gas impurity removal; carbon monoxide removal reformed gas; **methanol** removal reformed gas; ruthenium catalyst manuf particle size control

IT **Fuel cells**
(particle size control in manufacture of ruthenium catalyst on alumina supports for carbon monoxide and **methanol** removal from reformed gas for **fuel cells**)

IT 1344-28-1, Alumina, uses 7440-18-8, Ruthenium, uses
RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(particle size control in manufacture of ruthenium catalyst on alumina supports for carbon monoxide and **methanol** removal from reformed gas for **fuel cells**)

IT 1333-74-0P, Hydrogen, preparation
RL: PUR (Purification or recovery); PREP (Preparation)
(particle size control in manufacture of ruthenium catalyst on alumina supports for carbon monoxide and **methanol** removal from reformed gas for **fuel cells**)
IT 67-56-1, **Methanol**, processes 630-08-0, Carbon monoxide, processes
RL: REM (Removal or disposal); PROC (Process)
(particle size control in manufacture of ruthenium catalyst on alumina supports for carbon monoxide and **methanol** removal from reformed gas for **fuel cells**)

L20 ANSWER 31 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 1997-004493 [01] WPIX
DNN N1997-004054 DNC C1997-001056
TI **Fuel cell** system - has reforming device to reform **methanol** to **fuel** gas containing hydrogen and **fuel cell** to obtain electromotive force by electrochemical reaction of fuel gas.
DC L03 S03 X16
PA (TOYT) TOYOTA JIDOSHA KK
CYC 1
PI JP 08273690 A 19961018 (199701)* 32p H01M008-06
ADT JP 08273690 A JP 1995-100314 19950331
PRAI JP 1995-100314 19950331
IC ICM H01M008-06
ICS G01N027-416; H01M008-04
AB JP 08273690 A UPAB: 19970102
The **fuel cell** system has a reforming device to reform **methanol** to fuel gas containing H2, and the **fuel cell** to obtain electromotive force by electrochemical reaction of the fuel gas. The system is provided with a **methanol detecting** device, and an operation control device for the reforming device, to reduce **methanol concentration** according to the measured **methanol concentration**
ADVANTAGE - A **fuel cell** system which can prevent decreasing **fuel cell** output is provided with control of the reforming device to reduce **methanol concentration**
Dwg.3/27
FS CPI EPI
FA AB; GI
MC CPI: L03-E04
EPI: S03-E03; X16-C09; X16-C17

L20 ANSWER 32 OF 34 JICST-EPlus COPYRIGHT 2003 JST on STN
AN 900232940 JICST-EPlus
TI Study on fuel supplying method and **methanol concentration sensor** for the high efficient operation of **methanol fuel cells.**
AU TSUKUI TSUTOMU; DOI RYOTA; YASUKAWA SABURO; KURODA OSAMU
CS Hitachi, Ltd.
SO Denki Gakkai Ronbunshi. B (Transactions of the Institute of Electrical

Engineers of Japan. B), (1990) vol. 110, no. 1, pp. 67-76. Journal Code: S0809A (Fig. 17, Tbl. 1, Ref. 6)
ISSN: 0385-4213
CY Japan
DT Journal; Article
LA Japanese
STA New
AB Demands for the the application of **fuel cells** to home appliances and industrial equipments have been increasing because of their long life and continuous electricity. A **methanol fuel cell** is so handy that it is profitable use. It is most important for **fuel cells** to operate them with higher efficiency. A fuel supplying system which could operate the **methanol fuel cell** with higher efficiency was studied in the paper. Since the consumption ratio of water and **methanol** in the cell varied with operating conditions, the system which **methanol** and water, were supplied independently from tanks in the circulating system of anordic electrolyte was adopted firstly. Then, the amounts of **methanol** and water supply were controlled by **methanol concentration** uid level **sensors.** The **methanol concentration sensor** based on electrochemical reaction under constant voltage could accurately **detect methanol concentration** in the range of 0.4-1.5mol/l. On the other hand, the liquid level **sensors** were based on the principle that short circuit current flowed while they were immersed in anordic electrolyte, and were arranged at the upper, middle and bottom of the liquid level. As the result of operating the **methanol fuel cell** with this **fuel** supplying system, high efficient and stable characteristics of the cell within the variation of ±0.1mol/l of specified of **methanol concentration** could be obtained. (author abst.)
CC YB04040V (621.352.6)
CT liquid fuel cell; chemical **sensor**; concentration determination; energy conversion efficiency; fuel system apparatus; aliphatic alcohol
BT fuel cell; chemical cell; battery; **sensor**; instrumentation element; measurement; efficiency; alcohol; hydroxy compound

L20 ANSWER 33 OF 34 WPIX COPYRIGHT 2003 THOMSON DERWENT on STN
AN 1985-231429 [38] WPIX
DNN N1985-173409 DNC C1985-100391
TI Fuel concentration control method - and electrode material for recirculating **methanol**-air **fuel cell.**
DC L03 X16
IN HITACHIOH, I; HORIBA, T; IWAMOTO, K; KAMO, T; KITAMI, K; KUMAGAI, T; TAKEUCHI, S; TAMURA, K
PA (HITA) HITACHI LTD
CYC 4
PI DE 3508153 A 19850912 (198538)* 27p
GB 2157478 A 19851023 (198543)
JP 60189174 A 19850926 (198545)
GB 2157478 B 19870423 (198716)
DE 3508153 C 19870716 (198728)

US 4810597 A 19890307 (198912)
JP 03074468 B 19911127 (199151)
ADT DE 3508153 A DE 1985-3508153 19850307; GB 2157478 A GB 1985-55715 19850306; JP 60189174 A JP 1984-42081 19840307; GB 2157478 B GB 1985-5715 19850306; US 4810597 A US 1985-709204 19850307; JP 03074468 B JP 1984-42081 19840307
PRAI JP 1984-42081 19840307
IC H01M008-04
AB DE 3508153 A UPAB: 19930925
A liquid fuel electrical cell consisting of a fuel-electrode and an oxidant-electrode uses a recirculating mixture of **methanol** and sulphuric acid in water. The cell performance is improved by using a separate cell to react to the fuel-concentration and using this **signal** to **regulate** the supply of additional fuel/water mixture, so as to maintain a constant concentration Figure 1 shows an arrangement
of fuel tank (13) and acid tank (11) with **regulator** (10) and parallel bank of **fuel cells** (8). The sensing element used in the **regulator** is another **fuel-cell.**
Figure 2 shows a **regulator** circuit with feedback to the fuel admixture valve. The recirculating fuel (16) flows past the fuel electrode which is separated by an electrolyte in a membrane from oxidant-electrode (2) which has a flow of air directed at its other surface. The cell-voltage is **detected** by (17) and converted to a valve-control **signal** by (18) operating via (21) on valve (19).
In another construction the electrolyte between the electrodes 1 and 2 is the fuel-mixture itself.
2/2
FS CPI EPI
FA AB
MC CPI: L03-E04
EPI: X16-C; X16-E01

L20 ANSWER 34 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN
AN 1982:9438 CAPLUS
DN 96:9438
TI Fuel concentration **sensors** for fuel cells
PA Nissan Motor Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 4 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC H01M008-04
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 56118273	A2	19810917	JP 1980-20017	19800220
PRAI JP 1980-20017		19800220		

AB A temperature-compensated **sensor** located in the fuel line of an air-fuel (MeOH) fuel cell consists of a fuel electrode, a fuel chamber, a thermistor, a membrane, an air electrode, an air chamber having an

air-fuel supply tube, and a temperature compensation package. The composition of the
air-fuel supply to the **sensor** is kept constant, and the concentration difference between this supply and the fuel supply for the fuel cell generates a monitoring **signal.**

ST fuel cell concn **sensor**

IT **Fuel cells**
(**methanol**-air, **fuel concentration sensor** for)

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